

Transuranic Waste

...at the Nevada Test Site

Background

Transuranic waste is one of several types of waste handled by the U.S. Department of Energy National Nuclear Security Administration Nevada Site Office at the Nevada Test Site. Transuranic waste contains man-made radioactive elements heavier than uranium, hence the name “trans” or “beyond” uranium. Transuranic waste that contains both radioactive and hazardous* components is referred to as mixed transuranic waste and is managed in accordance with a signed agreement between the U.S. Department of Energy (radioactive component) and the State of Nevada (hazardous component).

Most of the transuranic waste managed at the Nevada Test Site was generated as part of a U.S. nuclear weapons research and development program at Lawrence Livermore National Laboratory near Oakland, California. This legacy waste, which was shipped to the Nevada Test Site for temporary storage between 1974 and 1990, includes protective clothing and miscellaneous equipment contaminated with transuranic elements. Additionally, a small quantity of the transuranic waste stored at the Nevada Test Site was generated by environmental restoration activities on the Nevada Test Site and the Tonopah Test Range.

Between January 2004 and November 2005, 1,860 drums of this legacy waste were shipped to the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico for permanent disposal. The transuranic waste remaining at the Nevada Test Site consists of 58 oversize boxes and approximately 200 drums which did not meet WIPP’s disposal requirements.



Waste Handling and Storage

These remaining containers of transuranic waste are metal and housed in a steel-framed, fabric-covered building at the Area 5 Radioactive Waste Management Complex. This structure rests on a 2.1-acre asphalt pad, which contains a protective waterproof layer to prevent moisture from seeping into the soil as well as an eight-inch curb to prevent run-on and runoff.

Because most transuranic elements decay by emitting alpha particles, the least penetrating form of radiation, a sheet of paper or the outer layer of skin can be used as shielding. However, an alpha-emitting isotope can enter the body through

inhalation, ingestion, or through a cut on the skin. Therefore, transuranic waste requires special handling, storage, and disposal.

To ensure the safety of Nevada Test Site personnel, the public, and environment, Nevada Site Office waste management specialists regularly inspect waste packages to verify that labels are intact and legible and that the containers remain structurally sound. Access to the facility is also controlled. These precautions are part of a comprehensive health and safety program.

* The term **hazardous waste**, as defined by the U.S. Environmental Protection Agency, refers to waste that is harmful to human health or the environment. Substances such as ethyl alcohol, Freon, and various metals are considered hazardous waste.

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WWM

Waste Characterization

Characterization and certification of all Nevada Test Site transuranic and mixed transuranic waste must be accomplished in order for WIPP to accept the waste for permanent disposal. An extensive characterization program designed to identify the physical and chemical components of the waste products was used at the Waste Examination Facility (WEF) to conform to WIPP's acceptance criteria.

Within the WEF, waste specialists performed several separate characterization processes on the waste. Some waste was also processed through a glovebox which is a large, sealed container designed to allow personnel to open, inspect, sort, and repackage transuranic waste without direct contact. The glovebox, and the building that houses it, provides a closed, secure environment with high-efficiency particulate air filters to ensure that all exhaust being released to the atmosphere meets air quality standards.

The Waste Isolation Pilot Plant (WIPP), located near Carlsbad, New Mexico, is the world's first underground repository licensed to permanently dispose of transuranic waste. Disposal rooms at the WIPP are mined to depths of 2,150 feet below the surface and are surrounded by a 2,000-foot thick salt formation that has been stable for more than 200 million years.



Loading of TRUPACT-II containers at the Nevada Test Site.

Some of the transuranic waste remaining in drums at the Nevada Test Site contain prohibited items identified through characterization and removed from other drums during glovebox operations. The transuranic waste contained in boxes is considered oversized and cannot currently fit within approved WIPP transportation containers. All of the remaining waste will either undergo size-reduction and/or additional characterization to determine the appropriate disposal path that meets all applicable laws and regulations; whether it be at WIPP, the Nevada Test Site, or an approved commercial facility.

Waste Transportation to WIPP

All transuranic waste destined for WIPP is shipped inside specially designed containers. These containers, known as *Transuranic Package Transporter Model II* (TRUPACT-II), can hold up to fourteen 55-gallon waste drums, two standard waste boxes, or one 10-drum overpack. Each truck can transport up to three TRUPACT-II containers at one time. All waste shipments must meet stringent U.S. Nuclear Regulatory Commission and U.S. Department of Transportation requirements before transport. Decisions regarding routes are determined through negotiations with the states in which proposed routes are located. Responsibility of transuranic waste shipments transfers to the WIPP once TRUPACT-II containers are loaded.

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